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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/734,374

12/12/2003

Lawrence C. Gunn III

LUX-P018

2810

7590

03/09/2005

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EXAMINER

PETKOVSEK, DANIEL J

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/734,374	Applicant(s) GUNN ET AL.	
	Examiner Daniel J. Petkovsek	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on application filed December 12, 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-154 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 79-154 is/are allowed.
- 6) ☒ Claim(s) 1-3, 13, 14, 16-20, 23-35, 37-42, 52, 53, 55-59, 62-74, and 76-78 is/are rejected.
- 7) ☒ Claim(s) 4-12, 15, 21, 22, 36, 43-51, 54, 60, 61 and 75 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This office action is in response to the application filed December 12, 2003. This application claims benefit of 60/456,381, filed March 21, 2003.

#### ***Specification***

1. The disclosure is objected to because of the following informalities: on page 17, line 4, there is a "7" attached to "with". The Examiner requests that any other minor informalities that come to the attention of the Applicant are corrected.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 13, 14, 16-20, 23-25, 30-34, 37, 40, 41, 52, 53, 55-59, 62-64, 69-73, and 76 are rejected under 35 U.S.C. 102(b) as being anticipated by Isobe et al. U.S.P. No. 5,208,800.

Isobe et al. U.S.P. No. 5,208,800 teaches (Figs. 1 and 13) an optical apparatus on a substrate comprising: first and second ports (55, 56), a non planar input coming perpendicularly to the apparatus (from 52), and a plurality of light scattering elements (54a-c) that are arranged in a plurality of curving rows, which clearly, fully meets the claimed limitations of claim 1.

Regarding independent claim 40, the light scattering elements are gratings.

Regarding claims 2 and 41, orthogonal components are split.

Regarding claims 13, 14, 52, 53, the light scattering elements are positioned at a plurality of points and curved lines in alignment.

Regarding claims 16-18 and 55-57, the curves have substantially uniform spacing, while scattering points can be placed between or at the intersections of the gratings.

Regarding claims 19, 20, 58, and 59, see Fig. 1 for concave sides facing both the first and second ports. Spacing between rows is substantially uniform.

Regarding claims 23-25 and 62-64, a lens couples light from the non-planar port to the device, while respective concave shaped elements face their respective ports.

Regarding claims 30 and 69, the elements can be consisted of semiconductor elements.

Regarding claims 31-33 and 70-72, a grating has varying characteristics throughout the device. The grating is shaped accordingly.

Regarding claims 34 and 73, the port is orthogonal.

Regarding claims 37 and 76, the grating reflects.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 26-29, 35, 38, 39, 42, 65-68, 74, 77, and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isobe et al. U.S.P. No. 5,208,800.

Isobe et al. U.S.P. No. 5,208,800 teaches (Figs. 1 and 13) an optical apparatus on a substrate comprising: first and second ports (55, 56), a non planar input coming perpendicularly

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to the apparatus (from 52), and a plurality of light scattering elements (54a-c) that are arranged in a plurality of curving rows. Isobe et al. '800 does not explicitly teach some of the dependent limitations as claimed.

Regarding claims 3 and 42, it is well known in the art to have optical integrated devices have bi-directional capabilities. Bi-directional capabilities increase the optical functionality of a device and decrease size of an optical apparatus by eliminating the need for another secondary element.

Regarding claims 26-29 and 65-68, it is well known in the art to use optical fiber, and in particular, single mode fibers, for the purpose of improving optical coupling efficiency to an optical integrated device. The dependent limitations of claims 26 and 65 are taught, as the elements are in the near field/Rayleigh ranges of the optical element (lens).

Regarding claims 35, and 74, non-planar ports are known in the art to be at a plurality of angles, including less than 10 degrees. Different angles of incoming signals can improve optical efficiency.

Regarding claims 38, 39, 77, and 78, anti-reflective coating and maskwork (to fabricate the optical apparatus) are well known in the art to both reduce reflection (optical error) and for use in the fabrication of the optical device. Anti-reflection coating improves optical coupling efficiency, and using masks improve fabrication steps.

#### *Allowable Subject Matter*

6. Claims 79-154 are allowed. The following is a statement of reasons for the indication of allowable subject matter: the relevant prior art of record does not teach or reasonably suggest the further limitation of having first and second flared waveguides with a hyperbolically curved

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sidewall (independent claim 79), or the further limitation of having a grating coupler (with an optical fiber) propagating planar wavefronts and non-planar wavefronts, with the plurality of scattering elements converting the wavefronts of light.

7. Claims 4-12, 15, 21, 22, 36, 43-51, 54, 60, 61, and 75 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The relevant prior art does not teach or reasonably suggest the following limitations:

Regarding claims 4-12 and 43-51, the prior art does not teach or reasonably suggest the use of *flared waveguides*.

Regarding claims 15, 21, 22, 54, 60, and 61, the prior art does not teach or reasonably suggest the use of *concentric homothetic elliptical curves defined by a first pair of foci*.

Regarding claims 36 and 75, the prior art of record does not teach or reasonably suggest the specific layered structure of semiconductor as claimed.

#### ***Inventorship***

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

#### ***Conclusion***


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9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. PTO-892 form references B-I.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Petkovsek whose telephone number is (571) 272-2355. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Daniel Petkovsek  
March 3, 2005



AKM ENAYET ULLAH  
PRIMARY EXAMINER